

REMARKS

This Amendment and Response is responsive to the Office Action mailed September 29, 2008. At the time of that Action, Claims 1-15, 17-23, and 25-26 were pending, Claims 16 and 24 having been withdrawn. The Examiner rejected Claims 1-15, 17-23, and 25-26 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,225,560 (hereinafter “Machado”). The Examiner also objected to Claim 2, stating that the dependency of the claim sequence is not correct. Applicant asserts that the dependency of the claim sequence is correct, and notes that Claim 2 was amended to depend from Claim 3 in the Amendment and Response filed on December 10, 2007.

In this Amendment and Response, Claims 1-5, 7-8, 11-12, 14, 17, 21, 23, 25, and 26 have been amended, and Claim 27 has been added. Reconsideration and full allowance are respectfully requested.

As described in the Specification of the present application, embodiments of the present invention address the need for power supply circuits and fabrication methods that allow for reduced size and enhanced power density. To achieve this, the embodiments of the present invention disclose different ways to orient a primary side circuit of a power supply circuit with respect to a secondary side circuit. As can be appreciated, the orientation provided by the various embodiments improves the power density, such that the power supply circuits may be desirable for applications that include size and form factor restrictions. Additionally, the orientation of the primary side circuit with respect to the secondary side circuit may also provide improved air and creepage distances between the primary side circuit and the secondary side circuit of a power supply.

As amended, Claim 1 is directed to a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding. The power supply circuit further includes a primary side circuit including a primary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a first plane, the primary side circuit being electrically connected to the primary winding of the transformer. The power supply circuit also includes a secondary side circuit including a secondary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a second plane substantially perpendicular to the first plane, the secondary side circuit being electrically connected to the secondary winding of the transformer.

As noted above, the Examiner cited Machado as teaching the subject matter of Claim 1, primarily citing Figures 9 and 12 and their associated text. Machado is directed to an electronic component package that incorporates a special base element that holds and electrically separates the individual conductors associated with the electronic components so that individual conductors may be bonded to external package leads and other conductors within the package. See the Abstract of Machado. More specifically, Figure 9 of Machado illustrates a component package 100 that includes a microelectronic component 104 (e.g., a toroidal transformer). The component package 100 includes an epoxy overmolding 144, and a plurality of electrical leads 120 that extend outside of the overmolding 144. Figure 12 of Machado illustrates the component package 100 when coupled to a top surface 402 of a circuit board 404 that is part of a circuit board assembly 400. The surface 402 of the circuit board 404 includes a plurality of conductive strips 408 that enable signals to be routed to different parts of the circuit board 404. Additionally, the electrical leads 120 of the component package 100 are coupled to the conductive strips 408 at contact elements 406. See col. 8, lines 37-58 of Machado.

Applicant asserts that Machado does not teach the elements of Claim 1. Specifically, Machado does not even mention a “primary side circuit” or a “secondary side circuit.” This is not surprising since, as noted above, Machado is directed to a component package, whereas Claim 1 is directed to a power supply circuit. As can be appreciated, power supply circuits generally have a primary side circuit coupled to a primary winding of a transformer, and a secondary side circuit coupled to the secondary winding of a transformer.

In the September Office Action, the Examiner equated the plurality of electrical leads 120 of the component package 100 (see Figure 12 of Machado) with the primary side circuit of Claim 1. It is unclear to the Applicant how the electrical leads 120 are equivalent to a primary side circuit of a power supply. First, primary side circuits generally may include one or more active and/or passive components including resistors, capacitors, transistors, integrated circuits, and the like, and generally do not consist of mere conductive strips (i.e., the electrical leads 120). Second, the reference numeral 120 in Machado refers to all of the electrical leads 120 of the component package 100, so even if one or more of the leads 120 are coupled to a primary winding of the transformer, other leads 120 are coupled to the secondary winding and/or other components in the package 100, which should not be the case for a primary side circuit.

The Examiner also equated the plurality of conductive strips 408 shown in Figure 12 of Machado with the secondary side circuit of Claim 1. As with the primary side circuit, the secondary side circuit generally includes more than a mere conductive strip 408. Further, the reference numeral 408 shown in Figure 12 of Machado refers generally to all the conductive strips 408 that may be used to route signals on the surface 402 of the circuit board 404, not just the strips 408 that may be connected to the secondary winding of a transformer. Therefore, Applicant asserts that the plurality of conductive strips 408 is not a “secondary side circuit.”

Because Machado does not disclose a power supply, a primary side circuit, or a secondary side circuit, it follows that Machado does not show a primary side circuit including a primary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a first plane, and a secondary side circuit including a secondary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a second plane substantially perpendicular to the first plane.

Accordingly, Applicants respectfully submit that Machado does not teach the elements of Claim 1. For the foregoing reasons, Applicants submit that Claim 1 and its dependent claims are patentable over Machado, and that this rejection should be withdrawn.

As amended, Claim 3 is directed to a power supply circuit that includes at least one transformer that includes a primary winding connected to a primary side circuit and a secondary winding connected to a secondary side circuit. Further, components of the primary side circuit and components of the secondary side circuit are each connected to at least one separate circuit carrier, the circuit carriers being coupled with one another. Additionally, at least a subset of the components of the primary side circuit and at least a subset of the components of the secondary side circuit are arranged in at least two different planes, wherein components of the primary side circuit are connected to a plurality of primary side circuit carriers.

Applicants respectfully submit that Machado does not teach the elements of Claim 3 for at least the reasons provided above with respect to Claim 1. As noted above, Machado does not mention a power supply, a primary side circuit, or a secondary side circuit. Additionally, since Machado does not even mention a primary side circuit, Machado does not teach a primary side circuit that include components that are connected to a plurality of primary side circuit carriers. For the foregoing reasons, Applicants submit that Claim 3 and its dependent claims are patentable over Machado, and that this rejection should be withdrawn.

As amended, Claim 25 is directed to a method for producing a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding, a primary side circuit, and a secondary side circuit. The method includes connecting components of the primary side circuit to at least one primary side circuit carrier, at least a subset of the components of the primary side circuit being substantially oriented in a first plane. The method also includes connecting components of the secondary side circuit to at least one separate secondary side circuit carrier, at least a subset of the components of the secondary side circuit being substantially oriented in a second plane. Further, the method includes coupling the primary side circuit with the primary winding of the transformer, and coupling the secondary side circuit with the secondary winding of the transformer, wherein the first plane is substantially perpendicular to the second plane.

Applicants respectfully submit that Machado does not teach the elements of Claim 25 for at least the reasons provided above with respect to Claim 1. For the foregoing reasons, Applicants submit that Claim 25 and its dependent claims are patentable over Machado, and that this rejection should be withdrawn.

As amended, Claim 26 is directed to a method for producing a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding, a primary side circuit, and a secondary side circuit. The method includes connecting components of the primary side circuit to at least one primary side circuit carrier, at least a subset of the components of the primary side circuit being substantially oriented in a first plane. The method also includes connecting components of the secondary side circuit to at least one separate secondary side circuit carrier, at least a subset of the components of the secondary side circuit being substantially oriented in a second plane. Further, the method includes coupling the primary side circuit with the primary winding of the transformer, and coupling the secondary side circuit with the secondary winding of the transformer, wherein the first plane is substantially perpendicular to the second plane, and wherein components of the primary side circuit are connected to a plurality of primary side circuit carriers.

Applicants respectfully submit that Machado does not teach the elements of Claim 26 for at least the reasons provided above with respect to Claim 1 and Claim 3. For the foregoing reasons, Applicants submit that Claim 26 and its dependent claims are patentable over Machado, and that this rejection should be withdrawn.

Claim 5 is directed to a power supply circuit according to Claim 1, wherein at least one of the primary side circuit carrier and the secondary side circuit carrier include an integrated resistor. Initially, Claim 5 is believed to be allowable as depending from an allowable base claim. Further, the section of Machado (col. 1, lines 21-29) cited by the Examiner discusses circuit board fabrication generally (thru-hole and SMT), without any mention of integrated components, much less integrated resistors. In fact, the word “resistor” does not even appear in Machado, so it is unclear to the Applicants how Machado discloses the subject matter of Claim 5. For the foregoing reasons, Applicants submit that Claim 5 is patentable over Machado, and that this rejection should be withdrawn.

Claims 6-13 are directed to power supply circuits according to Claim 1, and each of the claims include integrated capacitors. Initially, Claims 6-13 are believed to be allowable as depending from an allowable base claim. Further the section of Machado (col. 1, lines 42-52) cited by the Examiner discusses dual in-line chip packages, rather than integrated capacitors. In fact, the word “capacitor” does not even appear in Machado, so it is unclear to the Applicants how Machado discloses the subject matter of Claims 6-13. For the foregoing reasons, Applicants submit that Claims 6-13 are patentable over Machado, and that these rejections should be withdrawn.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: February 27, 2009